Epithelioid hemangioendothelioma of the radial artery

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Epithelioid hemangioendothelioma (EHE) is an extremely rare vascular tumor of intermediate malignancy. Generally it develops from the peripheral veins (usually the femoral vein). We report on a case of EHE of the radial artery, developed in a 26-year-old male patient, which presented as a solitary painless mass. He had a complete resection of the tumor and of the segment of radial artery involved. The histologic examination revealed an intravascular EHE, with low mitotic index and with insufficient histologic anormalities. (J Vasc Surg 2005;41:151-4.)

Vascular neoplasms consist of a rather heterogeneous group of lesions, mainly of epithelioid cells, comprising benign, malignant, and a few lesions of an intermediate degree of malignancy generally defined as "borderline"[1]; this group of tumors includes epithelioid hemangioma, epithelioid hemangioendothelioma (EHE), and epithelioid angiosarcoma.

EHE was first described in 1923. It usually occurs as a solitary lesion involving the soft tissues, shows no sex predilection, and is seen mainly in middle-aged adults, whereas cases in children are extremely rare.[2] As stated in the original series, the histologic features were similar to those of pulmonary lesions, previously described as intravascular bronchioalveolar tumor; however, it shows variable clinical behavior, and prognosis is difficult (if not impossible) to correlate with histologic appearance.[1] More than the half of these tumors developed from a blood vessel, generally from the larger veins of the limbs (iliac and femoral).[1-3] We report on a case of an EHE developed from radial artery.

CASE REPORT

We observed a 26-year-old male patient who had a small painless oval mass of hard-elastic consistency, localized to the right forearm. The echographic examination of the skillful forearm described the presence of a nodular formation of 2 to 3 cm of maximum transverse diameter, with unsharped ultrasound picture echogenecity and well vascularized. Those features were not typical for an aneurysm, pseudoaneurysm, or an arteriovenous fistula. Nuclear magnetic resonance–angiography (NMR-A) detected a dishomogeneous formation at the ventral portion of the forearm, localized in the septum between the brachioradial and the rotund pronator muscle (Fig 1). The lesion appeared well vascularized and delimited, with net and regular margins and without signs of infiltration of the surrounding structures. The patient was scheduled for elective surgical resection. Intraoperatively we observed the presence of an oval mass that was not dissociable from the radial artery (Fig 2). Therefore we carried out the complete resection of the neoformation along with the segment of the radial artery involved, following the clinical and ultrasonographic controls that confirmed the good vascularization of the hand. The histologic examination showed an epithelioid, intravascular hemangioendothelioma (EIHE), with low mitotic index and insufficient cytologic abnormalities. The tumor involved the arterial lumen, the arterial wall, and the perivascular tissues; it also showed the proliferation of several capillary vessels, which were delimited by endothelial, curved cells with epithelioid aspects. The capillary vessels showed unripe aspect and often lacked a well-defined lumen. The endothelial cells had eosinophilic cytoplasm, sometimes vacuolized and a vesicular core with central nucleolus. They had an intense immunoreactivity for the antigen of the von Willebrand factor, which represents one of the most important markers for the endothelial cells (Fig 3).

DISCUSSION

The EIHE is a tumor of intermediate malignancy that develops from the endothelial cells; EIHE is believed to be in the middle of the spectrum of epithelioid vascular tumors between benign epithelioid hemangioma and highly aggressive epithelioid angiosarcoma.[1,4] In the recently reported World Health Organization classification of soft tissue tumors, the intermediate endothelial tumors include benign and possibly non-neoplastic vascular proliferation spindle cell hemangioendothelioma, such as the endovascular papillary angioendothelioma (so-called Dabska's tumor), the retiform hemangioendothelioma, and Kaposi-like infantile hemangioendothelioma, which has low-grade malignant lesions and shows a high rate of local recurrence but rarely metastasizes. In contrast, since its definitive definition in 1982,[2] EIHE has been considered as a borderline or low-grade malignant neoplasm and has been described to have an unpredictable clinical course. The literature reported about 30 cases of EIHE, predominantly involving the arterial district of the limbs.[4,5] We found only one report describing an arterial EIHE that involved the upper limb and was originally thought to be an aneurysm after the clinical and radiologic work-up.[6]

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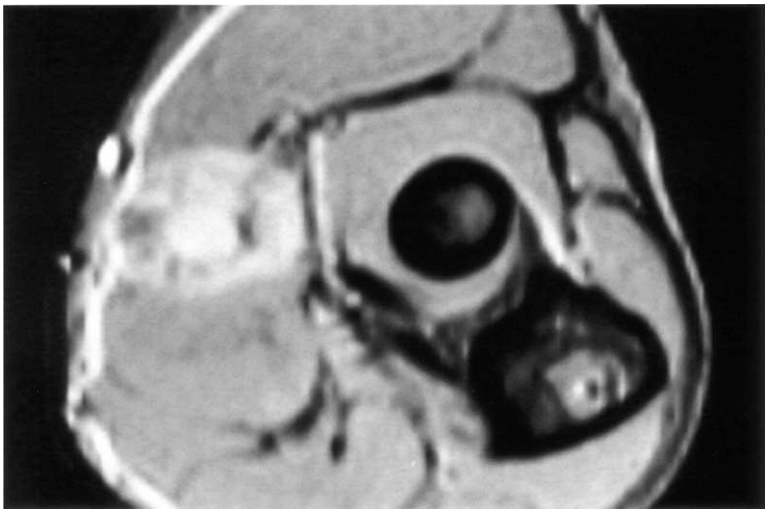

Fig 1. Preoperative NMR-A showed a mass localized in the septum between the brachioradial and the rotund pronator muscle.

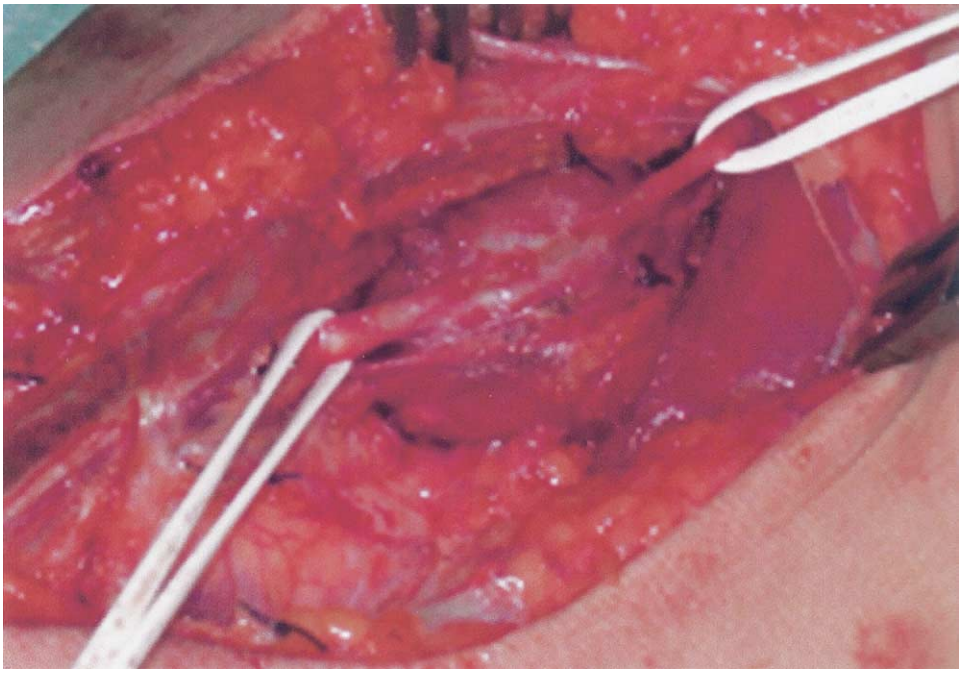

Fig 2. Intraoperative photograph of the mass. No cleavage planes from the radial artery were noted.

Because these tumors mostly involve the peripheral veins, they first clinically presented with symptoms and signs of deep venous thrombosis.[3] However, the clinical diagnosis is not definitive, because also benign tumors can start clinically with hemodynamic modifications as for benign lesions. Echographic examination can diagnose an aneurysm or an arteriovenous malformation and, meanwhile, is useful to evaluate its vascularization. Given the rarity of a malignant EIHE, especially in the upper extremity, soft tissue sarcoma should be considered higher on the differential diagnosis. NMR-A imaging might have been helpful in imaging this lesion. In addition, computed tomography (CT)–angiography or NMR-A is necessary to evaluate the relationships between the neoformation and the surrounding structures to detect the potential cleavage plane and the morphologic features of the lesion.[2] In fact, the clinical or radiologic identification of the EIHE is improbable, because these tumors can present with the same radiologic images and hemodynamic modifications similar to

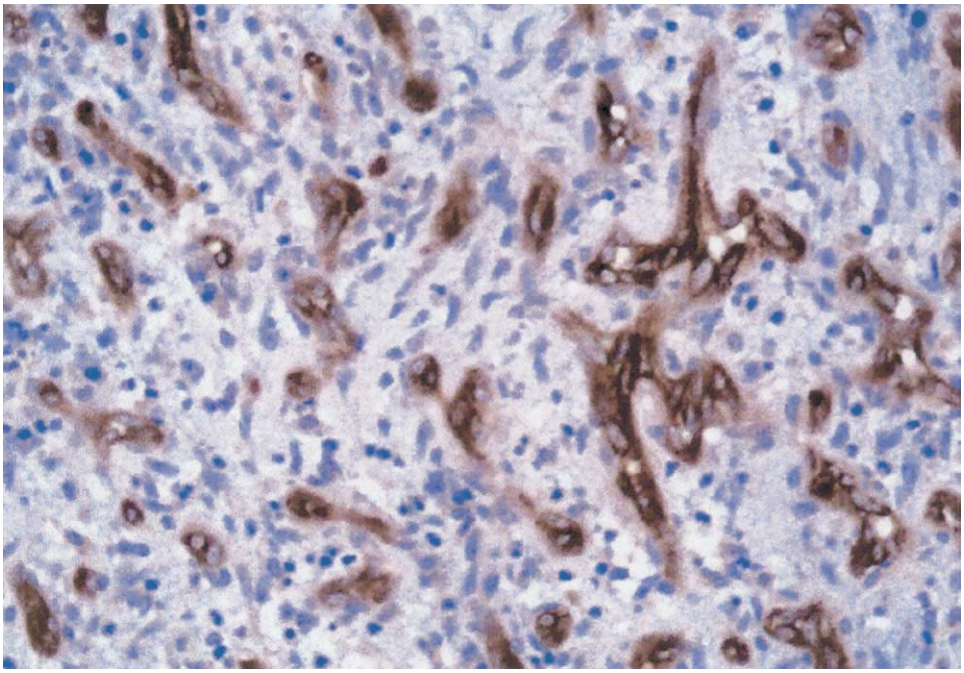

Fig 3. Immunohistochemical study. EIHE showed an intense positivity for von Willebrand factor (original magnification ×200).

those of benign lesions and for which guidelines for surgical treatment do not exist.[2] In fact, only the histologic examination assures the correct diagnosis.[1-4] When preoperative suspicion of malignancy is confirmed intraoperatively, or in the rare cases of malignancy already assessed by a cytologic examination, the treatment of choice should be the complete local excision of the neoformation, eventually associated with regional lymphadenectomy when macroscopically evident.[1,2,6-8] In our experience we spared the radial nerve because it was not involved by the mass; however, a reconstruction is possible if the tumor is not dissociable from it. Differently from those tumors with high-grade infiltration, amputation is rarely required because EIHE is a localized lesion. All of the patients who had simultaneous absence of metastasis and signs of local infiltration, in association with a cleavage plan from the adjacent structures, were favorably treated simply with the surgical resection of the tumor, because adjuvant chemotherapy or radiotherapy has not proved beneficial.[1-5] Although striking nuclear atypia, an increasing number of spindled cells, solid angiosarcoma-like foci, and more than 2 mitoses/10 high-power fields tended to be related to poor clinical outcome, only nuclear atypia and increasing proliferative activity have been reported to be a significant influence in bivariate statistical analysis. Recently it seemed that only a high mitotic rate (more than 6 mitoses/10 high-power fields) correlated clearly with bad prognosis in our cases.[1,8] Our patient had a low mitotic index and insufficient cytologic abnormalities; therefore, no adjunctive therapy was scheduled.

Because these tumors are rare and many are discovered after vascular repair or reconstructions have been done for a supposed benign cause, few patients underwent complete preoperative oncologic staging with total body CT scans and/or positron emission tomography survey to detect the presence of locoregional or distant metastasis; nevertheless, adjuvant radiotherapy or chemotherapy did not prove beneficial.[1,2,6] The rate of local recurrence is equal to 13%, and 30% of these tumors will metastasize; therefore follow-up program with spiral CT is recommended to study regional lymph nodes and lungs, which are the most involved sites. Fortunately, it has been reported they might not become evident for many years because of the slow growth of these tumors. Nevertheless, less than one half of the patients who develop metastasis die of this pathology and might survive for extended periods with an estimated overall mortality rate of less than 20% at 5 years.[1-3] Because half of these metastases develop into the locoregional lymph nodes, they are susceptible to surgical excision, allowing free long-term survival from the disease,[2,6] whereas lung metastases are susceptible of surgical resection when more than 1 cm in diameter or when a size progression is detected during the radiologic CT scans at follow-up.[5]

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